REMARKS

The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Official Action dated March 24, 2004. In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due reconsideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

Status of the Claims

Claims 4-9, 13-15, 18-23, 26-31 and 34-39 are under consideration in this application. Claims 1-3, 10-12, 16-25, and 32-33 are being cancelled without prejudice or disclaimer. Claims 4-9, 13-15, 26-31, and 34-39 are being amended, as set forth above, in order to more particularly define and distinctly claim Applicants' invention.

Additional Amendments

The claims are being amended to correct formal errors and/or to better disclose or describe the features of the present invention as claimed. Applicants hereby submit that no new matter is being introduced into the application through the submission of this response.

Formality Rejection

Claims 1 and 10-12 were rejected under 35 U.S.C. §101 on the grounds the claimed invention was directed to non-statutory subject matter. As claims 1 and 10-12 are being cancelled without prejudice or disclaimer, the rejection thus becomes moot.

Claims 2-6, 10-12, and 16-23 were objected to for various informalities, and Claims 1, 7, 9-12, 15 and 21-39 were rejected under 35 U.S.C. § 112, second paragraph, on the grounds of failing to clearly define the subject matter. As indicated, the claims have been amended as suggested or required by the Examiner.

Claims 1-39 were rejected under 35 U.S.C. § 112, first, paragraph, as failing to describe the subject matter in such a manner that would enable one skilled in the art to make or use the invention. In particular, "the specification does not clearly indicate which of the transgenic rice lines that showed proline accumulation were tested. It is not clear that all of the transgenic lines that showed an accumulation of proline remained viable." "The art teaches that while proline accumulation in plants is correlated with osmotic stress tolerance,

that it may also be toxic to plants (last para. of p. 7 of Office Action)", and "the specification only ambiguously indicates that several of the transgenic rice lines showing proline accumulation were tested for salinity tolerance, without providing any further detail on their identities (page 19). In the absence of further guidance, undue experimentation would be required to use the claimed invention, if the claimed plants are not viable in the presence of accumulate proline (p. 7 of Office Action)".

Applicants contend that, as of the priority date of this application, it was known to one skilled in the art that introducing anti-proDH to plants to make them more tolerant to freezing and high salinity than wild-type plants. See. Abstract of Nanjyo et al. (FEBS Letters, Vol. 461(1999), pp.205-210), which is cited in the corresponding United Kingdom Patent GB 2 376 236 and submitted by Applicants via IDS. Further, as described in the article titled "Improving the salt tolerance of proline-accumulated rice by suppressing Na+ absorption. Rice Genet. Newslett. 17:69-72. (2001) of Rice Genetic Newsletter Vol. 17" by Igarashi, Y. and Yoshiba, Y., the proline accumulation in plants is just may be toxic to the plants (p.71, lines 4-15) depending on which kind of plants. In term of rice plants (e.g., "*IR28, widely used as a strress-sentative breeding line (Akbar 1985)*"), the survival ratio after 72-hour NaCl treatment is increased with proper amount of Pro. See "Rice Genetic Newsletter Vol. 17" ("*As shown in Fig. 19b, Pro treatment was very effective in improving salt tolerance in rice. This is essentially true for IR28 with 10 to 100 mM Pro pretreatment... the survival ratio after 72-hour NaCl treatment increased dramatically from 0 to 90%. By contrast, concentrations of 500 mM decreased the survival ratio.*"). As such, no undue experimentation would be required to use the claimed invention, since rice plants are viable in the presence of proper amount of proline.

Accordingly, the withdrawal of the outstanding informality rejections is in order, and is therefore respectfully solicited.

Prior Art Rejections

Claims 3, 6, and 17 were rejected under 35 U.S.C. § 102(b) as being anticipated by an article Nippon Joshi Daigaku Kiyo, 1999, Vol. 7, pages 45-53, CAPLUS Accession Number 1999:500207, Document Number 132:61678 by Aoki et al. (hereinafter "Aoki"). Under 35 U.S.C. § 103(a), (1) Claims 1, 2, 6-16, 20-24, 28-32 and 36-39 were rejected on the grounds of being unpatentable over Zhu et al. (Plant Sci. 1998, Vol. 139, pages 41-48; hereinafter "Zhu") in view of Igarashi et al. (Plant Mol. Bio. 1997, Vol. 33, pages 857-865; hereinafter

"Igarashi"), Yoshiba et al. (Plant J. 1995, Vol. 7, pages 751-760; hereinafter "Yoshiba"), Rashid et al. (Plant Cell Rep. 1996, Vol. 15, pages 727-730; hereinafter "Rashid") and Shimamoto et al. (Nature, 1989, Vol. 338, pages 274-276; hereinafter "Shimamoto"). 2) Claims 3, 6-15, 17, 25 and 33 on the grounds of being unpatentable over Nanjo et al. (FEBS Lett., 1999, Vol. 461, pages 205-210; hereinafter "Nanjo") in combination with Rashid and Shimamoto. 3) Claims 4, 5, 18, 19, 26, 27, 34 and 35 were rejected on the grounds of being unpatentable over Zhu in view of Igarashi, Yoshiba, Rashid, and Shimamoto, in further view of Nanjo. These rejections have been carefully considered, but are most respectfully traversed.

The transgenic rice plant of the invention, as now recited in claim 4, in which have been introduced: (1) a P5CS gene of rice containing the sequence according to SEQ ID NO. 1, or a P5CS gene of Arabidopsis thaliana containing the sequence according to SEQ ID NO. 2, and (2) the antisense gene of a ProDH gene of Arabidopsis thaliana containing the sequence according to SEQ ID NO. 3.

The invention is also directed to a transgenic rice plant, as now recited in claim 5, in which have been introduced in tandemly connected relation to each other: (1) a P5CS gene of rice containing the sequence according to SEQ ID NO. 1, or a P5CS gene of Arabidopsis thaliana containing the sequence according to SEQ ID NO. 2, and (2) the antisense gene of a ProDH gene of Arabidopsis thaliana, said ProDH gene containing the sequence according to SEQ ID NO. 3.

The invention is also directed to a vector, as now recited in claim 6, in which have been introduced in tandemly connected relation to each other: (1) a P5CS gene of rice containing the sequence according to SEQ ID NO. 1, or a P5CS gene of Arabidopsis thaliana containing the sequence according to SEQ ID NO. 2, and the antisense gene of a ProDH gene of Arabidopsis thaliana, said ProDH gene containing the sequence according to SEQ ID NO. 3.

Although the prior art teaches a transgenic rice plant in which introduced "(1) a P5CS gene of rice containing the sequence according to SEQ ID NO. 1, or a P5CS gene of Arabidopsis thaliana containing the sequence according to SEQ ID NO.2, **OR** (2) the antisense gene of a ProDH gene of Arabidopsis thaliana containing the sequence according to SEQ ID NO 3", None of the cited references teach of suggest a transgenic rice plant in which introduced "(1) a P5CS gene of rice containing the sequence according to SEQ ID NO 1, or a

P5CS gene of Arabidopsis thaliana containing the sequence according to SEQ ID NO. 2, **AND** (2) the antisense gene of a ProDH gene of Arabidopsis thaliana containing the sequence according to SEQ ID NO3" are introduced is never disclosed in any of citations.

Applicants contend that there is no teaching of introducing both P5CS gene and antisense gene of ProDH in a rice plant in any one the cited prior art references. Rather, each reference is limited to introducing just one of P5CS gene and antisense gene of ProDH in a rice plant, not a combination of both. On the other hand, in the present invention, the choice of particular sequences, their connection locations, and sense or antisense orientation has been specified as Fig. 1D to serve the unique purpose of increasing proline accumulation 100 times or more in the present invention, as summarized by the Examiner on page 7 of the outstanding Office Action. One skilled in the art could not make a combination as claimed by the Applicants based on the above prior teachings except by using Applicants' invention as a blueprint. Applicants will point out that a rejection based on hindsight knowledge of the invention at issue is improper.

Contrary to the Examiner's assertion that "it was obvious that expression of both cDNA of Igarashi et al. or Yoshiba et al., along with the antisense sequence of Nanjyo et al., would lead to increase in proline and increase stress tolerance in the transgenic rice plant. It also would have been obvious to place the P5CS and antisense ProDH sequences in tandemly connected relation to each other in the transformation vector, and such an arrangement is an optimization of process parameter," the invention applies the specific combination to achieve unexpected results or properties. P5CS gene and antisense gene of ProDH are both introduced in a rice plant (Fig. 1D) such that the amount of proline accumulation in the transgenic rice plant is 100 times or more (p. 18, lines 13-22; 1st right column in Fig. 2.)with respect to that of the control samples (Figs. 1A-C).

The presence of these unexpected properties is evidence of nonobviousness. MPEP§716.02(a).

> "*Presence of a property not possessed by the prior art is evidence of nonobviousness. In re Papesch, 315 F.2d 381, 137 USPQ 43 (CCPA 1963) (rejection of claims to compound structurally similar to the prior art compound was reversed because claimed compound unexpectedly possessed anti-inflammatory properties not possessed by the prior art compound); Ex parte Thumm, 132 USPQ 66 (Bd. App. 1961) (Appellant showed that the claimed range*

of ethylene diamine was effective for the purpose of producing " 'regenerated cellulose consisting substantially entirely of skin' " whereas the prior art warned "this compound has 'practically no effect.' ").

Although "[t]*he submission of evidence that a new product possesses unexpected properties does not necessarily require a conclusion that the claimed invention is nonobvious. In re Payne, 606 F.2d 303, 203 USPQ 245 (CCPA 1979). See the discussion of latent properties and additional advantages in MPEP § 2145*," the unexpected properties were unknown and non-inherent functions in view of the cited references, since the cited references do not inherently achieve the same results. In other words, these advantages would not flow naturally from following the teachings of the cited references, since the cited references fails to suggest "introducing both P5CS gene and antisense gene of ProDH in a rice plant."

Applicants further contend that the mere fact that one of skill in the art could genetic engineers both P5CS gene and antisense gene of ProDH in a rice plant to meet the terms of the claims is not by itself sufficient to support a finding of obviousness. The prior art must provide a motivation or reason for one skilled in the art to provide the unexpected properties, such as increasing the amount of proline accumulation in the transgenic rice plant is 100 times or more, without the benefit of appellant's specification, to make the necessary changes in the reference device. *Ex parte Chicago Rawhide Mfg. Co.*, 223 USPQ 351, 353 (Bd. Pat. App. & Inter. 1984). MPEP§2144.04 VI C.

Applicants contend that neither the cited references, nor their combination teaches or discloses each and every feature of the present invention as disclosed in independent claims 4-6. As such, the present invention as now claimed is distinguishable and thereby allowable over the rejections raised in the Office Action. The withdrawal of the outstanding prior art rejections is in order, and is respectfully solicited.

Conclusion

In view of all the above, clear and distinct differences as discussed exist between the present invention as now claimed and the prior art references upon which the rejections in the Office Action rely, Applicants respectfully contend that the prior art references cannot anticipate the present invention or render the present invention obvious. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable reconsideration of this application is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of the above-captioned application, the Examiner is invited to contact the Applicants' undersigned representative at the address and phone number indicated below.

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